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Original Article

The serum level of cystatin C does not predict dopaminergic cell death in substantia nigra, evidence from 6-hydroxydopamine-induced animal model of Parkinson's disease

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Abstract

Introduction: Cystatin C (CysC) is an indicator of renal function, and has been recently reported that associates with neurodegenerative diseases. To investigate the role of this substance in Parkinson's disease (PD), we evaluated the association between serum levels of CysC and other markers of renal function with 6-hydroxydopamine (6-OHDA) induced Parkinsonism in rat.

Methods: The 6-OHDA was microinjected into the medial forebrain bundle by stereotaxic surgery. After behavioral tests, immunofluorescence and biochemical studies were carried out to determine the number of survived dopaminergic (DA) neurons in the substantia nigra pars compacta (SNc) and striatal dopamine level. The blood samples were collected from the caudal vain and the heart of animals. CysC was measured using the enzyme-linked immunosorbent assay (ELISA) kits.

Results: There was no difference in serum level of CysC between the 6-OHDA treated and control groups, as well as before and after the toxin in the 6-OHDA group. Also, no association was found between CysC and DA neuronal death in SNc or striatal dopamine level. In addition, there was no significant difference in serum levels of creatinine, urea and potassium ions between the control and 6-OHDA treated groups.

Conclusion: Since the death of DA neurons in SNc is the main pathophysiological mechanism underlying in the development of both 6-OHDA induced Parkinsonism and PD in human being, CysC and other markers of renal function cannot reflect DA neuronal death and accordingly cannot use for early diagnosis of PD.

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Keywords:
Parkinson's disease;
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Introduction

Parkinson's disease (PD) is the second most common neurodegenerative disease after Alzheimer's disease affecting about 6 million people in the world (Lees et al., 2009). Since the age of human populations